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Eupomacentrus diencaeus Jordan and Rutter

A Valid Species of Damselfish from the Western Tropical Atlantic[1]

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Among the fishes collected at Glover's Reef, Belize (=British Honduras) in 1970 and 1971, were specimens of a distinctive species of damselfish in the genus *Eupomacentrus,* which differed from all the currently recognized species of Rivas (1960), Böhlke and Chaplin (1968), Topp (1970), and Emery (1968, 1972). Examination of the syntypes of *Eupomacentrus diencaeus* Jordan and Rutter, 1898 (SU 4969), originally described from two specimens 79.9 and 78.9 mm. SL from Jamaica, showed them to be conspecific with the unidentified species from Belize. Rivas (1960) considered *E. diencaeus* to be a junior synonym of *E. variabilis* (Castelnau). *Eupomacentrus diencaeus* is, in fact, related to the *fuscus-dorsopunicans-variabilis* complex but has been confused with all three species. The genus *Eupomacentrus* in the western tropical Atlantic is in need of revision, however, only a review of the above complex will be undertaken here.

METHODS

All counts and measurements follow Hubbs and Lagler (1964). The gill rakers on the upper arch were counted by freeing the upper end of the

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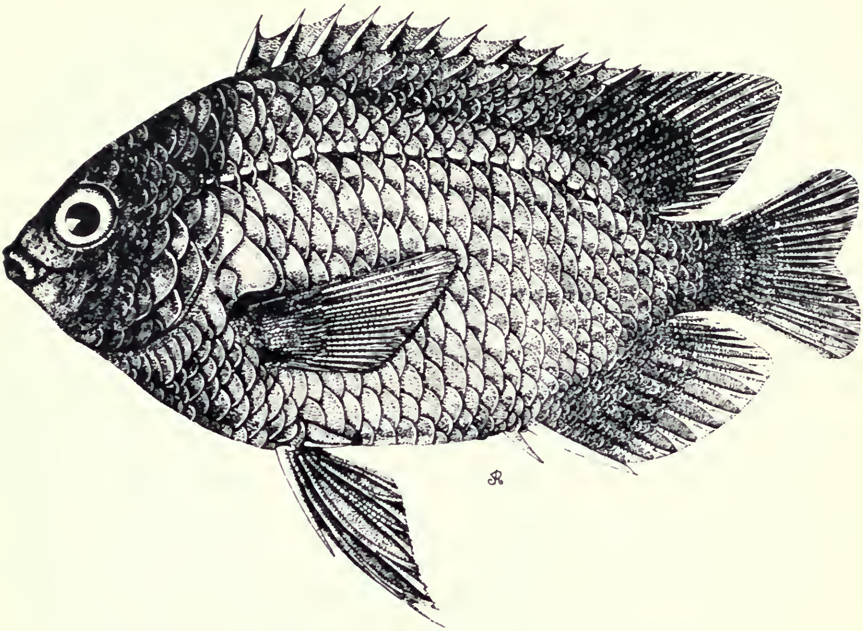

FIG. 1. *Eupomacentrus diencaeus* from Belize, SL 79.6 mm.

arch, so that all rudimentary gill rakers could be counted. Measurements were made using dial calipers to the nearest 0.01 mm. All measurements are expressed as proportions of the standard length, and were computed arithmetically by dividing one measurement into another. The number of scales from the lateral line to the anus was determined by starting at the fourth lateral-line scale and counting down a line to the front of the anus. The fourth lateral-line scale is included in the count and the small modified scale just above the anus is considered as one-half. Body proportions used in the description of *E. diencaeus* were taken from 15 individuals from Belize, ranging in standard length from 65.65-82.1 mm.

MATERIAL EXAMINED

Eupomacentrus diencaeus—SU 4969 (2) (Syntypes, Jamaica). Largest specimen (79.9 mm.) is in the best condition and is designated as the lectotype (Lectotype number unchanged when Stanford University collection transferred to California Academy of Sciences; Paralectotype now CAS 14901). Belize—FMNH 71316 (15). Haiti—ANSP 119217 (1); ANSP 119215 (15). Bahamas—ANSP 119218 (1); ANSP 119216 (4); ANSP 119171 (10). Anguilla—USNM 183458 (1).

Eupomacentrus dorsopunicans—Florida—UMML 4585 (3); FMNH 61468 (2); FMNH 61463 (1); FMNH 61453 (3). Bahamas—ANSP 119201 (1); ANSP 119200 (6). Cuba—SU 54173 (11). Jamaica—FMNH 61470 (17). Haiti—FMNH 61454 (4); ANSP 119210 (6). Puerto Rico—FMNH 61483 (7); FMNH 61437 (8). Anguilla Island—USNM 183458 (3). St. Barthelemy—ANSP 119207 (3). Dominica Island—USNM 249592 (10). Martinique Island—ANSP 119212 (10). St. Vincent Island—ANSP 119208 (8). Grenada Island—ANSP 119213 (10). Campeche Banks—FMNH 61746 (3). Serrana Bank—FMNH 71068 (10). Belize—FMNH 71319 (8); FMNH 71320 (7). Panama—CAS 13481 (1); SU 49743 (7); FMNH 61466 (7); FMNH 61467 (9).

Eupomacentrus fuscus—MNHN 8281 (1) (Holotype, Brazil). Brazil—SU 52286 (2); SU 22108 (13).

Eupomacentrus variabilis—Florida—FMNH 61623 (5); FMNH 61625 (2); FMNH 61636 (1); FMNH 61624 (1); FMNH 71214 (3). Puerto Rico—FMNH 61486 (2). Gulf of Mexico—FMNH 64162 (1); FMNH 61633 (1). Belize—FMNH 71315 (4). Venezuela—ANSP 119214 (1). Brazil—FMNH 62026 (5); FMNH 66325 (1).

Eupomacentrus diencaeus Jordan and Rutter. Figure 1, Table 1.

Eupomacentrus diencaeus Jordan and Rutter, Proc. Acad. Nat. Sci. Philadelphia, **49**, 1898, p. 116; Jordan and Evermann, Bull. U. S. Nat. Mus., no. 47, pt. 2, 1898, pp. 1552-1553; Jordan, Evermann and Clark, Rep. U. S. Comm. Fish. (1928), pt. 2, 1930, p. 413; Rivas, Quart. Jour. Fla. Acad. Sci., **23**, no. 2, 1960, pp. 147-150.

Description.—Dorsal fin elements XII-XIII, 14-16 (usually XII, 15); anal II, 12-14 (usually II, 13); pectorals 18-21 (usually 20); transverse scale rows from upper edge of gill opening to base of caudal rays 27-28 (mean = 27.67); dorsal lateral line with 18-20 scales (mean = 19.53); 3½ scales between the origin of dorsal fin and lateral line; 10½ scales from the 4th lateral line scale to the anus (no variation); gill rakers 6-10 + 11-13 (usually 8 + 11).

Depth of body 1.82-2.06 (mean=1.94, S.D. 0.0799); length of head 3.22-3.74 (mean 3.45, S.D. 0.1456); snout 11.16-15.26 (mean 13.53, S.D. 1.0364); diameter of orbit measured horizontally 9.71-10.89 (mean 10.29, S.D. 0.3589); bony interorbital width 11.54-16.02 (mean 12.58, S.D. 1.2015); depth of caudal peduncle 6.44-7.11 (mean 6.79, S.D. 0.1979); length of caudal peduncle 5.70-6.69 (mean 6.15, S.D. 0.2690); pelvic length 2.40-2.86 (mean 2.69, S.D. 0.1268); pectoral length 2.97-3.34 (mean 3.16, S.D. 0.1132); upper caudal rays 2.64-3.10 (mean 2.87, S.D. 0.1258);

lower caudal rays 3.08-3.48 (mean 3.32, S.D. 0.1299). No geographic variation noted (see table 1).

Color in Alcohol.—Head and body dark brown to black; centers of scales on lateral surface black, forming dark horizontal bars; all fins dark brown to black, posterior margins of soft dorsal and caudal fin sometimes light brown; pectoral fin with a small black spot on upper portion of base, entire pectoral axil black.

Color in Life (taken from 35 mm. transparency).—Color in life is similar to that in alcohol with the exception that the black and brown areas are darker. The leading edge of the anal fin is dark iridescent purple. Underwater a few individuals were seen to have a blotchy appearance, having a background color of dark gray with various portions of the body and fins being black.

Eupomacentrus fuscus (Cuvier and Valenciennes) and **Eupomacentrus dorsopunicans** (Poey)

Although Rivas (1960) considered *E. fuscus* and *E. dorsopunicans* to be synonymous, they are both distinct, valid species. *E. fuscus* most closely resembles *E. dorsopunicans* in general appearance, since they both have short anal fins which either do not reach the posterior end of the hypural plate, or extends only slightly beyond it. *E. fuscus* may be separated from *E. dorsopunicans* as well as from *E. diencaeus* and *E. variabilis* by the presence of 11½ scale rows from the 4th lateral-line scale to the anus, instead of 10½ as in the other species. In addition to the differences in number of scales from the lateral line to the anus, *E. fuscus* also differs from *E. dorsopunicans* in having a low number of gill rakers and a modal number of 16 dorsal rays instead of 15 (table 2). *E. fuscus* appears to be present only off Brazil, while *E. dorsopunicans* appears to replace it from Trinidad northward. Counts from various populations of *E. dorsopunicans* from Gulf of Mexico, Florida, West Indies, and Caribbean areas are presented in Table 3.

Eupomacentrus variabilis (Castelnau)

The long anal fin of *E. variabilis* extends well past the end of the caudal peduncle out to the caudal rays. *E. variabilis* may be separated from *E. fuscus, E. diencaeus,* and *E. dorsopunicans* by the presence of a reduced opercular scale immediately anterior to the opercular spine (fig. 2). Occasionally, a specimen of *E. variabilis* will have the smaller opercular scale on only one side, or it may be lacking in rare cases. The

TABLE 1. Counts of *Eupomacentrus diencaeus* from various localities.

	Pectoral rays				Anal rays			Dorsal rays			Gill rakers lower limb			Gill rakers upper limb				
	18	19	20	21	12	13	14	14	15	16	11	12	13	6	7	8	9	10
Belize		5	10		2	13		1	14		10	3	1		3	5	6	1
Bahamas	1	5	9			15			12	3	8	5	2	1	5	4	3	2
Anguilla		1				1				1	1						1	
Haiti		6	9	1	2	13	1		14	2	7	9			2	9	4	1
Jamaica			2			2		1		1		2					2	
Total	1	17	30	1	4	44	1	2	40	7	26	19	3	1	10	18	16	4

	Gill rakers total						
	17	18	19	20	21	22	23
Belize		1	6	5	1	2	
Bahamas	1	4	1	5	3		1
Anguilla				1			
Haiti		2	3	7	4		
Jamaica					2		
Total	1	7	10	18	10	2	1

TABLE 2. Comparison of counts for *Eupomacentrus variabilis*, *E. diencaeus*, *E. dorsopunicans*, and *E. fuscus*.

	Pectoral rays						Anal rays				Dorsal rays			Gill rakers lower limb						
	18	19	20	21	22	23	12	13	14	15	14	15	16	7	8	9	10	11	12	13
E. variabilis		9	12	5				16	1		1	12	4	1		15	10			
E. diencaeus	1	17	30	1			4	44	1		2	40	7					26	19	3
E. dorsopunicans		2	20	112	33	1	4	150	13	1	5	140	18		1	16	132	18		1
E. fuscus			7	6	2			6	9			2	13			6	9			

Gill rakers

	upper limb								total											
	3	4	5	6	7	8	9	10	12	13	14	15	16	17	18	19	20	21	22	23
E. variabilis			13	11	2						10	9	7							
E. diencaeus				1	10	18	16	4						1	7	10	18	10	2	1
E. dorsopunicans	1	3	19	65	48	24	7			3	4	21	56	50	22	8	2	1		
E. fuscus	2	3	7	3					1	2	4	7	1							

TABLE 3. Counts of *Eupomacentrus dorsopunicans* from various localities.

	Pectoral rays					Anal rays				Dorsal rays		
	19	20	21	22	23	12	13	14	15	14	15	16
Florida			11	1			9	3		1	10	1
Bahamas			5	2			7			2	4	1
West Indies	1	14	65	20		3	92	5		1	89	10
Caribbean	1	6	31	10	1	1	42	5	1	1	37	6
Totals	2	20	112	33	1	4	150	13	1	5	140	18

	Gill rakers lower limb						Gill rakers upper limb							Gill rakers Total								
	8	9	10	11	12	13	3	4	5	6	7	8	9	13	14	15	16	17	18	19	20	21
Florida			11	1					1	4	5	2				1	3	6	2			
Bahamas			7						1	2	3	1				1	2	3	1			
West Indies		7	79	13		1			5	38	30	20	7			8	31	33	17	8	2	1
Caribbean	1	9	35	4			1	3	12	21	10	1		3	4	11	20	8	2			
Totals	1	16	132	18		1	1	3	19	65	48	24	7	3	4	21	56	50	22	8	2	1

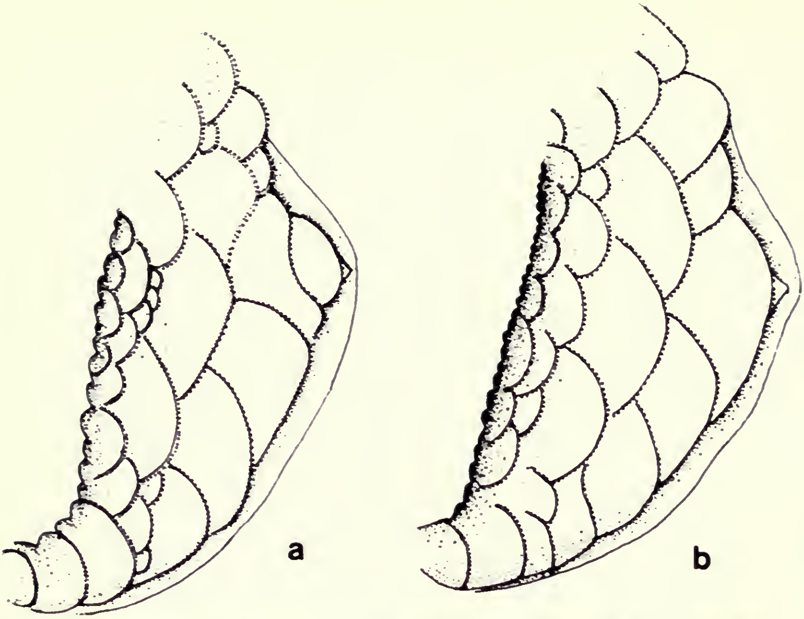

FIG. 2. Pattern of opercular scales of **a**, *Eupomacentrus variabilis* and **b**, *E. diencaeus*.

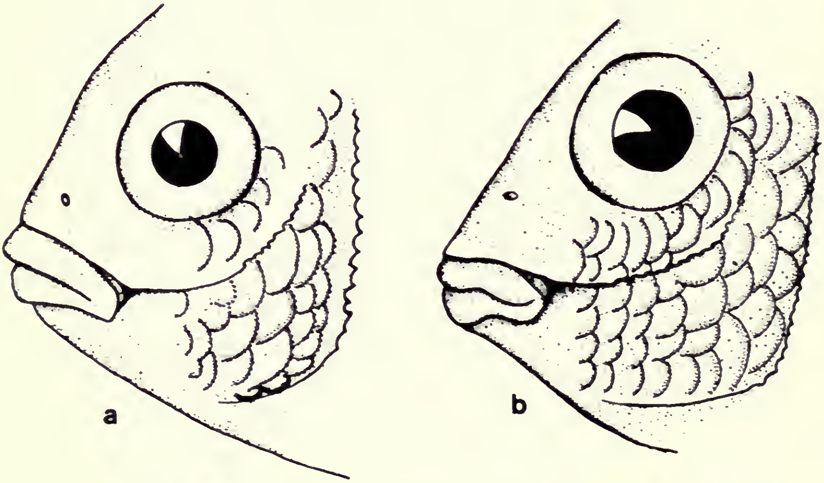

FIG. 3. Head of **a**, *Eupomacentrus leucostictus* and **b**, *E. diencaeus*, modified from Böhlke and Chaplin (1968).

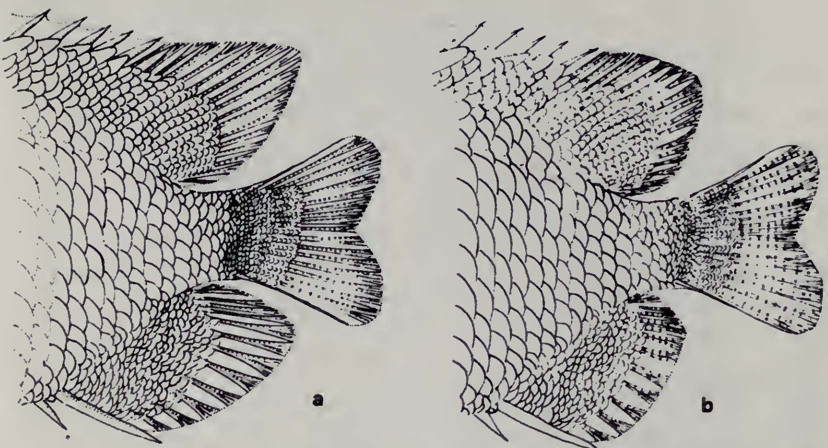

FIG. 4. Posterior portions of **a**, *Eupomacentrus diencaeus* showing relative lengths of the anal fin and **b**, *E. dorsopunicans.*

lack of the small scale may be the result of injury to the opercle. *E. variabilis* may be separated from *E. diencaeus,* which also has a long anal fin, on the basis of its having fewer gill rakers (table 2). The color pattern of *E. variabilis* (75 mm. SL or smaller) is distinctive. The dorsal surface of the head and body is dark brown to black in preservative and life, while the sides and ventral surface of the head and body are light tan to white in preservative and bright yellow in life. *E. diencaeus, E. fuscus,* and *E. dorsopunicans* are uniformly dark, lacking either a lighter undersurface or sides. *E. variabilis* also usually (but not always) has a distinct black spot on the top of the caudal peduncle, while the other species lack such a spot as adults. Preserved specimens of *E. variabilis* larger than 75 mm. SL often lose the caudal peduncle spot and sometimes are uniformly colored as in the other species. The only other species which share the long anal fin with *E. variabilis* and *E. diencaeus* and with which they could be confused are *E. leucostictus* (Müller and Troschel) and a new species of *Eupomacentrus,* the honey damselfish, to be described by A. R. Emery and W. E. Burgess (p. 435 in Böhlke and Chaplin, 1968). *E. leucostictus* has a low number of pectoral rays as do some of the individuals of *E. diencaeus* and *E. variabilis;* however, the head of *E. leucostictus* is more rounded and the body more slender. Also, the scales on the suborbital of *E. leucostictus* end under the center of the pupil of the eye, while they extend forward anterior to the pupil in both *E. diencaeus* and *E. variabilis* (fig. 3). The posterior margin of the preopercle is scaled in both *E. diencaeus* and *E. variabilis,* while it is naked in *E. leucostictus* (fig. 3).

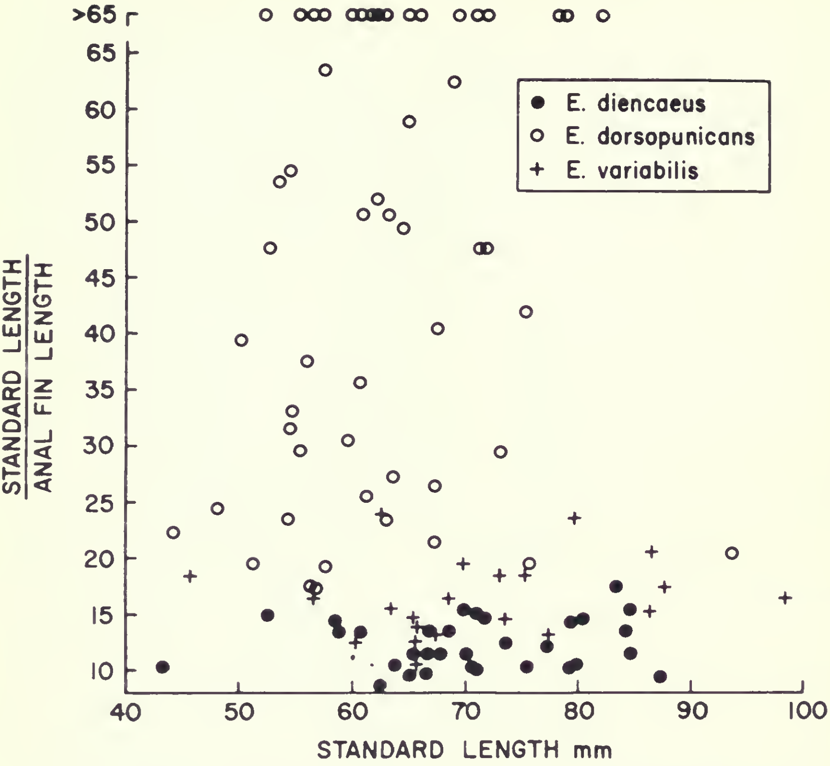

FIG. 5. Standard length anal fin length versus standard length for *Eupomacentrus diencaeus*, *E. dorsopunicans*, and *E. variabilis*. >65 also includes individuals with anal fins not reaching the end of the caudal peduncle.

The honey damselfish, *Eupomacentrus* sp., has 19 or 20 pectoral rays, usually 20, as in *E. variabilis;* however, it has the opercular scale pattern typical of *E. diencaeus*. The posterior margin of the preopercle is naked as in *E. leucostictus*, while the scales on the suborbital extend forward anterior to the pupil as in *E. diencaeus* and *E. variabilis*. The top of the head and nape of the honey damselfish is pale (yellow) between blue lines and rows of spots.

Eupomacentrus diencaeus Jordan and Rutter

E. diencaeus is a very darkly colored species with a long anal fin, which extends well past the origin of the caudal rays. The distance that the anal fin rays extend past the end of the caudal peduncle expressed as a proportion of the standard length can be used to separate *E. diencaeus* from its closest relative *E. dorsopunicans* (figs. 4, 5). In *E. diencaeus* this proportion ranges from 8.91-17.45, while *E. dorsopunicans* ranges from 16.97 to a fin which does not reach the end of the caudal peduncle. Of the 168 specimens of *E. dorsopunicans* examined, only one individual had an anal fin which fell within the range of *E. diencaeus. E. diencaeus* may also be separated from *E. dorsopunicans* on the basis of the number of gill rakers on the lower limb of the gill arch. *E. dorsopunicans* has a range of 8-11 with a mode at 10, while *E. diencaeus* has a range of 11-13 with a mode at 11 (table 2). Modal differences also exist for the number of pectoral rays, with *E. diencaeus* having a range of 18-21 with a mode at 20, and *E. dorsopunicans* having a range of 19-23 with a mode at 21 (table 2).

E. diencaeus and *E. dorsopunicans* appear to be well separated ecologically at Glover's Reef, Belize. *E. dorsopunicans* was collected only in shallow, wave-swept areas on the windward reef, while *E. diencaeus* was taken only in deeper water or within the lagoon where there was an absence of wave action. *E. diencaeus* was also taken on the reef crest at the leeward side of Glover's Reef, but wave action was also absent in this area. Within the lagoon and on the leeward reef, *E. diencaeus* is the most abundant species of damselfish. In no case were the two species found occurring in the same area. Studies are now in progress to determine the feeding habits and interactions of these two species.[1]

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[1] Specimens of *E. diencaeus* from Florida have recently been received from C. R. Robins, but arrived too late to be included in this paper.

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ABBREVIATIONS

ANSP— Academy of Natural Sciences of Philadelphia
CAS— California Academy of Sciences
FMNH— Field Museum of Natural History
MNHN— Museé National D'Histoire Naturelle, Paris
SU— Stanford University (these specimens are now at CAS)
UMML— University of Miami, Marine Laboratory
USNM— United States National Museum

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